

cerdo Rayneri.—Prof. Ralph Tate, rectification of the nomenclature of *Purpura anomala*, Angas.—E. Meyrick, descriptions of Australian Microlepidoptera; parts 3 and 4, *Tineina*.—J. Brazier, on a new variety of *Bulimus Caledonicus*.

SOCIETIES AND ACADEMIES

LONDON

Chemical Society, March 17.—Prof. Roscoe, president, in the chair.—The following papers were read:—On the volume of mixed liquids, by F. D. Brown. The author has determined with very great care the alteration in volume which takes place when various liquids are mixed. The liquids experimented with were carbon disulphide and benzene, carbon disulphide and carbon tetrachloride, carbon tetrachloride and benzene, dichlorethane and benzene, dibromethane and benzene, and carbon tetrachloride and toluene. The experiments were made at 20° C. The author concludes that these changes of volume are dependent on the chemical character of the molecules, and not on such physical properties as vapour tension, molecular volume, &c.—On the action of alcohol on mercuric nitrate, by R. Cowper. When mercury is dissolved in twelve times its weight of nitric acid (1·3), the solution allowed to stand until all nitrous fumes have escaped, and twelve parts by weight of pure alcohol added, a crystalline precipitate is formed, with or without heating, which the author has investigated; it has the constitution $(C_2H_5Hg_3O_2)(NO_3)_2$; he has also prepared the hydrate and oxalate of the dyad radical $(C_2H_5Hg_3O_2)$.—On boron hydride, by F. Jones and R. L. Taylor. Magnesium boride is first prepared by heating a mixture of recently-ignited boric anhydride, with twice its weight of magnesium dust, in a covered crucible. On treating the magnesium boride with hydrochloric acid, boron hydride is obtained, always however mixed with a large excess of hydrogen. Its composition is probably BH_3 ; it resembles in many of its properties arsine (AsH_3) and stibine (SbH_3).—On the action of aldehydes on phenanthraquinone in presence of ammonia, by F. R. Japp and E. Wilcock.—On the action of benzoic acid on naphthaquinone, by F. R. Japp and N. H. J. Miller.—Note on the appearance of nitrous acid during the evaporation of water, by R. Warington. The author proves that the nitrous acid is always derived from the atmosphere or from the products of combustion from the source of heat used for evaporating; he also gave some account of the marvellously delicate test proposed by Griess for nitrous acid. The solution is acidified, and some sulphanic acid with some hydrochlorate of naphthylamin added; if nitrous acid be present, equal to one part of nitrogen in 1000 millions of water; a rose-red tint is developed.—On the sweet principle of *Smilax glycyphylla*, by Dr. Wright and Mr. Rennie.—Note on usnic acid and some products of its decomposition, by the late J. Stenhouse and C. E. Groves.—On the absorption of solar rays by atmospheric ozone, and on the blue tint of the atmosphere, by W. N. Hartley. The author concludes that the higher regions of the atmosphere contain much more ozone than the layers near the earth's surface, and that the blue tint of the atmosphere is largely due to ozone.—On the nature of certain volatile products contained in crude coal-tar benzenes, by Watson Smith.—On New Zealand Kauri gum, by E. H. Rennie. On distillation this gum yields a terpene, boiling at 157°–158°.

Geological Society, March 9.—Robert Etheridge, F.R.S., president, in the chair.—Robert Thompson Burnett, William Erasmus Darwin, Charles James Fox, and the Rev. T. Granger Hutt were elected Fellows of the Society.—The following communications were read:—Description of parts of the skeleton of an Anomodont reptile (*Platyposaurus robustus*, Ow.); Part II. The Pelvis, by Prof. Owen, C.B., F.R.S. In this paper the author described the remains of the pelvis of *Platyposaurus robustus*, which have now been relieved from the matrix, including the sacrum, the right "os innominatum," and a great part of the left ilium. There are five sacral vertebrae, which the author believes to be the total number in *Platyposaurus*. The neural canal of the last lumbar vertebra is 8 lines in diameter, and of the first sacral 9 lines, diminishing to 6 lines in the fifth, and indicating an expansion of the myelon in the sacral region, which is in accordance with the great development of the hind limbs. The sacral vertebrae increase in width to the third; the fourth has the widest centrum. This coalescence of the vertebrae justifies the consideration of the mass, as in Mammalia, as one bone or "sacrum," which may be regarded as approaching in shape that of the Megatherioid mammals,

although including fewer vertebrae. Its length is $7\frac{1}{2}$ inches; its greatest breadth at the third vertebra, $5\frac{1}{2}$ inches. The ilium forms the anterior and dorsal walls of the acetabulum, the posterior and postero-ventral walls of which are formed by the ischium and pubis. The diameter of its outlet is 3 inches, the depth of the cavity $1\frac{1}{2}$ inch; at its bottom is a fossa $1\frac{1}{2}$ inch broad. The foramen is subcircular, 1 inch in diameter. The ventral wall of the pelvic outlet is chiefly formed by the pubis; it is a plate of bone 6 inches broad, concave externally, convex towards the pelvic cavity. The subacetabular border is 7–8 lines thick; it shows no indication of a pectineal process, or of a prominence for the support of a marsupial bone. The author remarks that of all examples of pelvic structure in extinct Reptilia this departs furthest from any modification known in existing types, and makes the nearest approach to the Mammalian pelvis. This is shown especially by the number of sacral vertebrae and their breadth, by the breadth of the iliac bones, and by the extent of confluence of the expanded ischia and pubes.—On the order Theriodontia, with a description of a new genus and species (*Elurosaurus felinus*, Ow.), by Prof. Owen, C.B., F.R.S. The new form of Theriodont reptile described by the author in this paper under the name of *Elurosaurus felinus* is represented by a skull with the lower jaw, obtained by Mr. Thomas Bain from the Trias of Gough, in the Karoo district of South Africa. The post-orbital part is broken away. The animal is mononarial; the alveolar border of the upper jaw is slightly sinuous, concave above the incisors, convex above the canines and molars, and then straight to beneath the orbits. The alveolar border of the mandible is concealed by the overlapping teeth of the upper jaw; its symphysis is deep, slanting backward, and destitute of any trace of suture; the length of the mandible is $3\frac{1}{4}$ inches, which was probably the length of the skull. The incisors are $\frac{5-5}{5-5}$ and the molars probably $\frac{5-5}{5-5}$

or $\frac{6-6}{6-6}$, all more or less lanianiform. The length of the ex-

serted crown of the upper canine is 12 millims.; the root of the left upper canine was found to be twice this length, extending upwards and backwards, slightly expanded, and then a little narrowed to the open end of the pulp-cavity. There is no trace of a successional canine; but the condition of the pulp-cavity and petrified pulp would seem to indicate renewal of the working part of the canine by continuous growth. The author infers that the animal was monophyodont. *Elurosaurus* was said to be most nearly allied to *Lycosaurus*, but its incisor formula is Dasyurine. With regard to the characters of the Theriodontia the author remarked that we may now add to those given in his "Catalogue of South African Fossil Reptiles" that the humerus is perforated by an entepicondylar foramen and the dentition monophyodont.—Additional observations on the superficial geology of British Columbia and its adjacent regions, by G. M. Dawson, D.Sc. This paper is in continuation of two already published in the Society's *Journal* (vol. xxxi. p. 603, and vol. xxxv. p. 89). In subsequent examinations of the southern part of the interior of British Columbia the author has been able to find traces of glaciation in a north to south direction as far as or even beyond the 49th parallel. Iron Mountain, for instance, 3500 feet above the neighbouring valleys, 5280 feet above the sea, has its summit strongly ice-worn in direction N. 29° W. to S. 29° E. Other remarkable instances are given which can hardly be explained by local glaciers; boulder-clay is spread over the entire district; terraces are cut in the rearranged material of this, bordering the river-valleys, and at greater elevations expanding over the higher parts of the plateau and mountains. At Mount It-ga-chuz they are 5270 feet above the sea. The author considers that the higher terraces can only be explained by a general flooding of the district. Some of the wide trough-like valleys of the plateau contain a silty material which the author regards as a glacial mud. North of the 54th parallel and west of the Rocky Mountains similar evidence of glaciation is obtained; erratics are found in the Peace and Athabasca basins. The fjords of British Columbia are extremely glaciated, the marls being generally in conformity with the local features; terraces are scarce and at low levels. The Strait of Georgia was filled by a glacier which overrode the south-east part of Vancouver's Island; evidence is given to show that this ice came from the neighbouring mountainous country. Queen Charlotte's Island shows evidence of local glaciation. Boulder-clays and stratified drifts are found, with occasional Arctic shells. The author considers that the most

probable explanation of the phenomena of the whole region is to suppose the former existence of a great glacier mass resembling the inland ice of Greenland, and that the Glacial period was closed by a general submergence, during which the drifts were deposited and, at its close, the terraces cut.

Photographic Society, March 8.—J. Glaisher, F.R.S., president, in the chair.—Papers were read by Mr. Payne Jennings on art photography. It was asserted that unfavourable criticisms, both from artists and the press, had been the result from the exhibition of works which deserved such severity, and that to raise the status of art in photography more attention must be given to art-rules.—Also by Mr. Edwin Cocking, on notes on photography and art. An incisive comparison was drawn between the art of the painter and that of the photographer, showing the essential difference between the two in the production of a pictorial work, both in the *modus operandi* of production and the individuality capable of being infused into each result. Also that art in photography required a totally different training to that necessary for the painter, and that the time had arrived when special instruction by a thoroughly organised school for art photography had become absolutely necessary.

Institution of Civil Engineers, March 22.—Mr. Abernethy, F.R.S.E., president, in the chair.—The paper read was on the comparative endurance of iron and mild steel when exposed to corrosive influences, by Mr. D. Phillips, M. Inst. C.E.

PARIS

Academy of Sciences, March 21.—M. Wurtz in the chair.—The following papers were read:—On determination of the masses of mercury, Venus, the Earth, and of solar parallax, by M. Tisserand.—Observations of Faye's comet, at Paris Observatory, by MM. Tisserand and Bigourdan.—On the possibility of making sheep refractory to anthrax through preventive inoculations, by M. Pasteur, with MM. Chamberland and Roux. M. Pasteur controverts M. Toussaint's views on the subject, and says his method is very uncertain.—The vaccine matter of anthrax, by the same. A wholly harmless bacterium can be got from the most virulent by cultivation in animals different from those apt to take the disease. There are as many distinct germs as there are different kinds of virulence.—Researches on formic ethers, by MM. Berthelot and Ogier. They are formed with absorption of heat.—New navigation-maps, giving both the direction and force of the wind in the Indian Ocean, by M. Brault. Meteorologically the parts of that ocean above and below the equator are distinct (and the author indicates how).—On the operations of the Syndical Association of the Beziers Arrondissement to oppose phylloxera, by M. Janssan.—Report on the work of the Council of Public Hygiene and Salubrity, by M. Brezançon.—On the surface with sixteen singular points and 0 functions with two variables, by M. Darboux.—On the functional determinant of any number of binary forms, by M. Le Paige.—On the decomposition into primary factors of uniform functions having a line of essential singular points, by M. Picard.—On certain simultaneous linear differential equations with partial derivatives, by MM. Picard and Appell.—On generator polygons of a relation between several imaginary variables, by M. Lecornu.—Solution of a general problem on series, by M. André.—On linear differential equations with algebraic integrals, by M. Poincaré.—On the distribution of energy in the normal solar spectrum, by Prof. Langley. The total heat coming from the sun to the earth is much greater than has been believed (even in estimates accused of exaggeration). If the totality of the solar radiations reached us we should have a sensation of blue rather than white. (The author studied the absorption for each ray).—On a synthetic apparatus reproducing the phenomenon of circular double refraction, by M. Gouy. This consists of a number of thin and narrow rectangular lamellæ of crystal placed side by side like floor-boards, and cemented between two glass plates. In a given direction the optic axis of each band forms a constant angle with the preceding one. A half-wave plate is placed above.—On radiophony with selenium, by M. Mercadier. The sounds here result chiefly from the luminous rays from the limit of blue to extreme red, and even a little in infra-red, the maximum being in the yellow.—Experiments at the Crenot works in optical measurement of high temperatures, by M. Crova. The spectropymeter is proved practically useful.—On the electromotive force of the voltaic arc, by M. Le Roux. With a galvanometer of great resistance and a single contact operated with the hand, one may prove the difference of potential of the carbons even $\frac{1}{10}$ of a second after cessation of

the current. The phenomenon is probably thermo-electric.—The hissing of the voltaic arc, by M. Maudet. The difference of potential between the carbons is very great when the arc is silent, very small when it hisses.—On magic mirrors of silvered glass, by M. Laurent. The magic effect can be had through the mode of mounting of the mirror.—On the flow of gases, by M. Neyreneuf. The laws of this may be verified by a method like that for determining electric resistances.—On new combinations of hydrobromic and hydriodic acid with ammonia, by M. Troost.—Action of hydrochloric acid on chloride of lead, by M. Ditte.—Action of sulphuric acid newly heated to 320°, and oils, by M. Maumené.—On a new means of analysis of oils, by the same. This consists in treating a measured quantity of oil with one of a titrated aqueous solution of caustic alkali.—Separation of oxide of nickel and oxide of cobalt, by M. Delvaux.—On a process of industrial manufacture of carbonate of potash, by M. Engel.—On some complex compounds of sulphur and nitrogen, by M. Demarçay.—On tar from cork, by M. Bordet. It contains more hydrocarbons than tar from coal, and less of oxygenated substances than tar from hard woods.—On the fermentation of urea, by M. Richet. The stomachal mucus of animals in general causes ammoniacal fermentation of pure urea.—Physiological and therapeutical properties of cedrine and valdivine, by MM. Dujardin-Beaumetz and Restrepo.—Physiological action of *Erythrina corallodendron*, by MM. Bochefontaine and Rey.—On lesions of the bones in locomotor ataxy, by M. Blanchard.—On the presence of trichina in adipose tissue, by M. Chatin.—On the virulent state of the foetus in sheep dead from symptomatic anthrax, by MM. A. Arloing, Cornevin, and Thomas.—Illusion relative to the size and distance of objects from which one withdraws, by M. Charpentier. The objects seem to enlarge on approach.—On the organs of taste of osseous fishes, by M. Jourdan.—Toxic power of pancreatic microzymas in intravenous injections, by MM. Béchamp and Balten.—Human bones found in the diluvium of Nice—the geological question, by M. Desor. The deposit (at Carabacel) belongs to the category of strata contemporary with the erosion of tertiary plateaux.—Description of the bones, by M. Niepce.—Determination of the race, by M. de Quatrefages. It seem to be the same as that of the men of Cro-Magnon.—On a new genus of primary fish, by M. Gaudry. MM. Riche found it in the Permian of Igornay. It is remarkable for the great size of its ribs, and is called *Megapleuron Rochei*. It had lozenge scales.—On the existence and characters of the Cambrian formation in the Puy-de-Dôme and Allier, by M. Jullien.—General law of formation of mineral waters; application to Greoux (Basses-Alpes), by M. Dieulaufait.—On the discovery at Noir-Montiers (Vendée) of the Eocene flora with *Sabalites Andegavensis*, Sch., by M. Crié.—Observations on variations of temperature of the human body during movement, by M. Villari. The results agree with M. Bonnal's.

CONTENTS

	PAGE
MIND IN ANIMALS. By GEORGE J. ROMANES, F.R.S.	501
AMERICAN INDIAN LANGUAGES. By A. H. KEANE.	503
LETTERS TO THE EDITOR:—	
Hot Ice.—Dr. OLIVER J. LODGE; J. B. HANNAY; GEORGE B. RICHMOND (With Diagrams)	504
The Oldest Fossil Insects.—Rev. A. E. EATON	506
Oceanic Phenomenon.—Surgeon H. B. GUPPY	507
The Banks of the Yang-tse at Hankow.—Surgeon H. B. GUPPY	507
An Experiment on Inherited Memory.—W. MATTIEU WILLIAMS	508
Meteors.—J. PARNELL	508
Classification of the Indo-Chinese and Oceanic Races.—H. J. MURTON	508
Fascination.—CARL OCHSENIUS	508
Flying-Fish.—Commander ALLAN D. BROUN	509
THE OXFORD COMMISSIONERS ON PROFESSORS	509
THE INTERNATIONAL GEOLOGICAL CONGRESS. By C. E. DE RANCE	510
THE FALLS OF NIAGARA IN WINTER. By WILLIAM LANT CARPENTER (With Illustration)	511
ZOOLOGICAL RESULTS OF THE VISIT OF PROF. K. MOEBIUS TO MAURITIUS. By H. N. MOSELEY, F.R.S.	514
NOTES	515
OUR ASTRONOMICAL COLUMN:—	
A New Variable Star	517
Minima of Algol, &c., in 1880	517
The Red Spot upon Jupiter's Disk	517
The Minor Planets	517
PHYSICAL NOTES	517
GEOGRAPHICAL NOTES	518
PRIZES OF THE PARIS ACADEMY OF SCIENCES	518
MEASURING THE INDEX OF REFRACTION OF EBONITE. By Professors AYRTON and PERRY (With Diagram)	519
MOLECULAR ELECTROMAGNETIC INDUCTION. By Prof. D. E. HUGHES, F.R.S.	519
SCIENTIFIC SERIALS	522
SOCIETIES AND ACADEMIES	523